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## Mixed care networks of community-dwelling older adults with physical health impairments in the Netherlands

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### Abstract

As part of long-term care reforms, home-care organisations in the Netherlands are required to strengthen the linkage between formal and informal caregivers of home-dwelling older adults. Information on the variety in mixed care networks may help home-care organisations to develop network type-dependent strategies to connect with informal caregivers. This study first explores how structural (size, composition) and functional features (contact and task overlap between formal and informal caregivers) contribute to different types of mixed care networks. Second, it examines to what degree these network types are associated with the care recipients' characteristics. Through home-care organisations in Amsterdam, the Netherlands, we selected 74 frail home-dwelling clients who were receiving care in 2011–2012 from both informal and formal caregivers. The care networks of these older adults were identified by listing all persons providing help with five different types of tasks. This resulted in care networks comprising an average of 9.7 caregivers, of whom 67% were formal caregivers. On average, there was contact between caregivers within 34% of the formal–informal dyads, and both caregivers carried out at least one similar type of task in 29% of these dyads. A principal component analysis of size, composition, contact and task overlap showed two distinct network dimensions from which four network types were constructed: a small mixed care network, a small formal network, a large mixed network and a large formal network. Bivariate analyses showed that the care recipients' activities of daily living level, memory problems, social network, perceived control of care and level of mastery differed significantly between these four types. The results imply that different network types require different actions from formal home-care organisations, such as mobilising the social network in small formal networks, decreasing task differentiation in large formal networks and assigning co-ordination tasks to specific dyads in large mixed care networks.

**Keywords:** care network, formal care, informal care, older adults

### What is known about this topic

- Seventeen per cent of older adults in Europe use care from both formal and informal caregivers.
- Health status and living arrangements are associated with receiving care from both formal and informal caregivers.
- In mixed care situations, formal and informal caregivers provide complementary or supplementary care.

### What this paper adds

- A network perspective reveals four types of mixed care networks that differ in structural and functional dimensions.
- Between the four network types, older care recipients differ in health, social network, mastery and perceived control of care.
- Differentiated strategies by home-care organisations may enhance contact with informal caregivers in specific network types.

### Introduction

The focus of this study is on community-dwelling older adults who receive care from both informal (spouses, relatives, non-kin) and formal caregivers (home-care professionals), referred to henceforth as a mixed care network. To date, this concerns a rela-

tively small proportion of the older population. In Europe, on average, only 17% of the older adults with care receive help from both types of caregivers, and this percentage varies widely across countries, ranging from 3% in the Czech Republic to 22% in the Netherlands and 32% in Belgium (Suanet *et al.* 2012). However, in the light of population ageing and

government cutbacks on professional residential care (Da Roit 2012), the proportion of older adults receiving care from multiple formal and informal caregivers in their home is likely to increase in the coming years. Dutch reform of long-term care entails considerable cutbacks in professional home care and is explicitly aimed at increasing the informal component in long-term care. To achieve this objective, the Dutch government has stated that a stronger 'connection' between formal and informal caregivers is required, for example, by involving informal caregivers in all stages of the care process and more frequently discussing the care with them. Yet, current care practice shows that even in mixed care networks, there is little contact between formal and informal caregivers (e.g. Sims-Gould & Martin-Matthews 2010). Also, most home-care organisations have not yet developed a clear view on the role and responsibilities of informal caregivers, let alone a clear-cut strategy to involve them (more) in the care process.

To increase our understanding of what facilitates the formal–informal connection, we need to study individuals using both types of care. Moreover, we need to study the entire care network, as this will increase the insight into existing interaction patterns between the formal and informal network (Carpentier & Ducharme 2003). Studying networks will provide a more complete picture of how many formal and informal caregivers enter the home on a weekly basis, how many (of all present) discuss the care with others and to what degree these network features are related to characteristics of the care recipient. As mixed care networks may vary in structure (e.g. composition) and functioning (e.g. task overlap), home-care organisations may need to develop differentiated strategies to improve contact with informal caregivers in specific types of networks. Our study thus has three general aims as follows: (i) to examine different types of mixed care networks of home-dwelling older adults; (ii) to describe profiles of care recipients for each type of network; and (iii) to discuss which strategies home-care organisations might undertake to increase the connection with informal caregivers in these network types.

### Mixed care networks

Although the structure of the care network is considered to be important for understanding care processes (Carpentier & Ducharme 2003), there is little empirical evidence of what care networks look like in terms of numbers, types, tasks and interactions between individual helpers. We do know that *informal* care networks are quite small, ranging from two to eight

informal caregivers (Keating *et al.* 2003, Keating & Dosman 2009), but there is a lack of detailed information on the number and types of formal helpers. Empirical evidence shows that utilisation of formal care is most likely in heterogeneous networks in which multiple kin and non-kin caregivers are present (Keating & Dosman 2009). This implies that a large informal network can coincide with a large formal network, suggesting that the size and composition of mixed care networks are to some degree associated with each other. Ryan *et al.* (2013) did provide information on all members and ties of the mixed care network of four frail older persons. Although limited in terms of the number of cases, their study showed that contact between formal and informal caregivers is sparse. While most caregivers are aware of the presence of other helpers, few of them communicate or collaborate in the delivery of care. Moreover, their study suggests that contact patterns are not linearly related to size; a large network could involve both frequent and infrequent contact patterns between helpers. Detailed information on all caregivers is thus needed to understand how structural and functional features contribute to different types of mixed care networks.

In this study, we build on the above studies by collecting data on all caregivers and formal–informal caregiver dyads within the care network of 74 community-dwelling older adults in the Netherlands. We are the first to present information on both structural (size, composition) and functional aspects (task overlap and contact between formal and informal helpers). Consistent with other studies (e.g. Keating & Dosman 2009), we construct network types, which make it easier to establish profiles of care recipients within these types. The first research question is (1) Which types of mixed care networks can be distinguished when size, composition, contact and task overlap between helpers are taken into account?

### Care recipient characteristics

To understand variations in mixed care network types, we associate them with individual determinants of the use of care (Andersen & Newman 2005) and distinguish between the need for care (e.g. health impairment), the disposition to use care (e.g. attitudes, preferences) and enabling factors (e.g. the presence of spouse or children) that facilitate or limit the use of care. Longitudinal studies have shown that the use of formal care generally follows from the use of informal care, and is to a large extent based on health impairment and/or the loss of spousal care (Geerlings

*et al.* 2005). In fact, the number of formal helpers present increases where health impairment is greater (Li 2005, Allen *et al.* 2012). A mixed care network by definition contains at least one informal caregiver, but the number and type of informal helpers vary widely with the social context of the care recipient. The size of the informal care network is generally smaller when it includes a spouse and larger when close kin and friends are among the helpers (Keating & Dosman 2009, Allen *et al.* 2012). Living arrangements and the social network are thus important for the features of the mixed care network. Only a few studies on care use have included preferences, personality traits or attitudes as dispositional factors, as gender, age and level of education are generally used as proxies (Geerlings *et al.* 2005). Yet, home-care users more often prefer formal to informal care (Pinquart & Sörensen 2002), have less strong personality characteristics as indicated by a low sense of mastery (Schuijt-Lucassen & Broese van Groenou 2006) and feel they have less control over the care process (Janlöv *et al.* 2006). To explore the differential effect of the types of determinants on the structure and functioning of the network, our second research question examines (2) the degree to which the care recipients' need (physical and cognitive health), disposition (feeling in control of care, sense of mastery and preference for informal care) and enabling factors (living arrangements, social network size) are associated with the different network types.

## Method

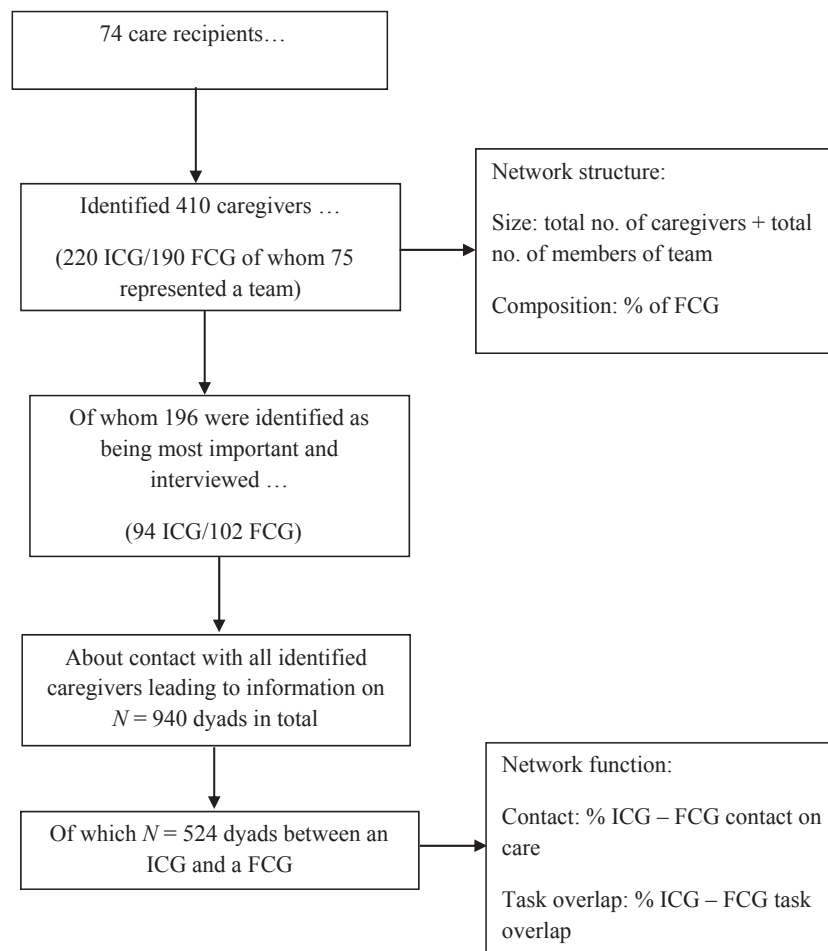
### Sample

Data were collected between autumn 2011 and summer 2012 as part of the 'Care Networks of Frail Older Adults' study (Jacobs *et al.* 2014). As older adults with mixed care networks make up only small proportions in population surveys, we worked with a purposive sample and recruited participants via home-care organisations. Older care recipients living at home were identified through eight home-care organisations in Amsterdam and the surrounding area; they were approached based on the services provided to home-dwelling older adults. Team managers provided contact information for those care recipients who (in their opinion) were cognitively able to participate in a face-to-face interview, were aged 65 or older and were receiving care from both informal and formal caregivers. No selection was made on the basis of gender, specific age categories, physical impairment or specific diseases. Team managers first consulted their clients before providing

contact information. Those willing to be approached received a letter informing them of the purpose of the study (contact between formal and informal caregivers). They were contacted by telephone by the research team and asked to participate in a face-to-face interview. According to the guidelines of the Netherlands Medical Research Involving Human Subjects Act, the study did not require ethical approval. Of the 119 care recipients approached, 75 participated in the study and signed a letter of informed consent stating that confidentiality of personal identity and information was ensured. Respondents who did not participate felt physically or mentally unable to do so ( $N = 22$ ), did not match the inclusion criteria ( $N = 21$ ) or died before they were contacted by the research co-ordinator ( $N = 1$ ). Due to missing information on one of the dependent variables, one respondent was excluded from the analysis, leaving 74 care recipients in the current study.

### Identifying caregivers

Figure 1 presents a flow chart of the identification and selection of caregivers of the 74 respondents. Respondents were asked to identify all the persons who helped them with five types of tasks: instrumental activities of daily living (IADL), activities of daily living (ADL), nursing, transport and/or administrative tasks. The 74 care recipients identified a total of 220 informal caregivers and 190 formal caregivers ( $N = 410$ ) and reported on hours of care per week per type of care. Of the 190 formal caregivers, 75 represented a team and provided information on the total number of caregivers in their team. The team members were not identified in the network at the dyadic level, but were used for calculating network size. To obtain information on the contact between caregivers, the interviewer asked the care recipient to identify their most important caregivers, and at least one formal and one informal caregiver was approached by telephone for a face-to-face interview. A total of 94 informal caregivers and 102 formal caregivers participated. These 196 interviewed caregivers reported on contact with all 410 identified caregivers, thus creating a data set of 940 caregiver dyads. Note that these are not all the potential dyads in the networks, as dyads of caregivers who were not interviewed were not included in the database. Only the information on the 524 formal–informal dyads was used in this study, as we were only interested in formal–informal contact. The 193 formal–formal and 223 informal–informal dyads are not reported in this study.



**Figure 1** Overview of identified and interviewed caregivers providing information that was aggregated to the network level. ICG, informal caregiver; FCG, formal caregiver.

## Measurements

### Network structure

The *size of the care network* was calculated by adding together all identified caregivers *per network* and, if appropriate, adding the size of the formal team (ranging from 1 to 14 excluding the team leader), as we wanted to count the total number of different caregivers entering the home weekly. We also added together the number of formal and distinct types of informal helpers, namely household members, children living outside the home, other kin and non-kin. The *proportion of formal caregivers* was calculated as the total number of formal caregivers divided by network size.

### Network function

We asked each of the caregivers interviewed the following questions regarding each of the other caregivers identified: 'How often do you discuss the care

of the care recipient with...?' Response categories were 1 = daily to 7 = never, recoded into 0 = no (7) and 1 = yes (1–6). The *proportion of contact* between formal and informal helpers was calculated as the number of dyads with contact divided by the total number of dyads in the network. For all dyads, we constructed a variable indicating whether the two helpers in the dyad provided at least one similar type of care task (0 = no, 1 = yes). We aggregated the *proportion of task overlap* by dividing the number of dyads with overlap in tasks by the total number of dyads. We also added up the total number of hours of formal and informal care.

### Care recipient characteristics

Basic demographic characteristics are measured: *sex* (0 = male, 1 = female), *age* (in years) and *level of education* (1 = elementary school, 6 = university level).

Three health indicators were used. The *total number of chronic diseases* reflects the prevalence of eight



major chronic illnesses, including diabetes, cardiovascular disease, stroke, cancer, lung disease, incontinence, joint damage (e.g. arthritis) and osteoporosis. To measure the level of *functional disability*, the respondents completed a seven-item index of ADL (Katz *et al.* 1970) and an eight-item index of IADL (Lawton & Brody 1969), indicating on a 5-point scale to what extent they could independently perform these activities (1 = without any difficulty, 5 = not at all). The ADL items ( $\alpha = 0.86$ ) and IADL items ( $\alpha = 0.65$ ) were added together, with a higher score indicating more functional disabilities. Finally, respondents were asked whether they suffered from memory difficulties, indicating *cognitive functioning* (0 = no problems, 1 = some memory problems).

Four indicators of the disposition to use care were used. The respondent indicated on a single item who in their care network they *felt to be in control of the care decisions*: 1 = the respondent alone or with assistance of others and 0 = others. *Mastery* was indicated by the five-item version of the Pearlin Mastery Scale (Pearlin & Schooler 1978), with sum scores ranging from 5 to 25 (low-high, Cronbach's  $\alpha = 0.70$ ). To indicate *preference for informal care*, respondents reported to what degree five items (De Klerk & Huijsman 1992) were applicable, e.g. 'If older adults need help for their personal care, they should be able to count on children, family or neighbours' (1 = completely disagree, 5 = completely agree). A higher sum score (range 6–30, Cronbach's  $\alpha = 0.60$ ) indicates a stronger preference for informal care. For all scales, missing item scores were replaced by the mean of the other item scores of the respondent ( $N = 12$ ). In cases where all items were missing, the score was replaced by the sample mean ( $N = 2$ ).

The social context included *household composition* (1 = living alone, 2 = living with others) and involvement in a *social network*, measured using the six-item Lubben Social Network Scale (Lubben *et al.* 2006). This scale measures the level of perceived (social) support received from family, friends and neighbours. The total sum score ranges from 0 to 30 (low–high). A score of 12 or lower indicates a risk of social isolation (Lubben *et al.* 2006).

### Statistical analysis

Descriptive statistics of all variables studied were calculated using IBM SPSS 21.0. Network size, proportion of formal helpers, proportion of contact and proportion of task overlap were the input variables for a network typology. To explore possible typology dimensions, we used principal component analysis (PCA) because this method transforms possibly corre-

lated variables into a set of values of linearly uncorrelated components (Jolliffe 2002). This resulted in two components with eigenvalues above 1 that together explained 73% of the total variance. On the first component (factor 1), the *proportion of formal helpers* and the *proportion of contact* had high factor loadings (0.88 and 0.79 respectively), an eigenvalue of 1.62 and explained variance of 41%. On the second component (factor 2, eigenvalue = 1.30, 33% variance explained), the *size of the care network* had a high factor loading (0.85), together with the *proportion of task overlap* (–0.73). Factor scores were saved from both components using the regression method. We dichotomized both factor scores (low = below 0, high = 0 and above) and defined four network types: type 1 = low on both factors; type 2 = low on factor 2, high on factor 1; type 3 = high on factor 2, low on factor 1; and type 4 = high on both factors. Across these four network types, we calculated differences in network characteristics and individual characteristics using *F*-tests and chi-squared tests. Pairwise comparison of means in network types was calculated using Sheffé's option in ANOVA. The subjects-to-variables ratio of 18.5 (74 cases, four variables) was sufficient for a PCA (Arrindell & van der Ende 1985).

## Results

### Care recipient description and the care network

The majority of the sample were female (69%, Table 1) and lived alone (76%). The average age was 83 years. The men in the sample were more often living with a resident spouse or child than the women (54% and 15%, respectively,  $\chi^2 = 6.90$ ,  $P < 0.05$ ). The majority (72%) had two or more chronic diseases and reported disability problems due to physical impairment. About half of the sample reported arthritis, and between 27% and 34% reported diabetes, heart failure, incontinence or osteoporosis. Nearly, 30% reported having memory problems. Half of the older adults (52%) were at risk of social isolation as indicated by a score below 12 on the Lubben Scale. About one-third (36%) felt in control of the care process, and of those, the majority reported that they were in control of the care process together with at least one informal or formal caregiver. In sum, this depicts the sample as being fairly impaired, both physically and socially, with a high care need and with little control over the care process.

The network identification method resulted in care networks comprising an average of 9.7 caregivers, of whom 67% were formal caregivers. On average, there was contact between caregivers within 34% of the

**Table 1** Descriptive statistics of care recipient characteristics (*N* = 74)

	%	Mean	SD	Range
Female	69			
Age		83.30	7.67	66–99
Level of education		3.67	1.31	1–6
No. of chronic diseases		1.98	0.98	0–5
% reported to be suffering from				
Diabetes	30			
Stroke, cardiovascular disease	10			
Heart failure	32			
Cancer	16			
Lung disease	22			
Incontinence	34			
Arthritis	54			
Osteoporosis	27			
ADL		11.77	4.90	5–25
IADL		23.92	7.15	11–49
% with cognitive problems	30			
% living alone	76			
Social network size		13.18	6.17	2–28
% in control of care	34			
Mastery		16.30	4.06	7–25
Preference for informal care		19.09	4.52	9–28

ADL, activities of daily living; IADL, instrumental activities of daily living.

formal–informal dyads, and both caregivers carried out at least one similar type of task in 29% of these dyads (Table 2).

### Network types

The PCA resulted in four network types that varied on almost all network features studied (Table 2). As regards care recipient characteristics (Table 3), the level of disability (in particular ADL), memory problems, feeling in control of the care process, sense of mastery and social network size differed significantly among the four types.

The first type is labelled the ‘small mixed care network’ (*N* = 17; 23%). This care network was the smallest in size, with an average of 5.1 helpers, and consisted of an equal mix of informal and formal helpers, in terms of both number of helpers and hours of care provided (around 5 hours per week). The informal helpers were more likely to be children living outside the home in addition to non-kin and other kin. There was contact between formal and informal helpers in only 15% of the formal–informal dyads in the network. Many of the care recipients in this type of network received no personal care or nursing care, and 70% of them received household care from both formal and informal helpers (data not shown). This explained the relatively high proportion

of task overlap between formal and informal helpers (42%), but also showed that household care apparently does not require contact between formal and informal helpers. Care recipients had relatively little ADL and IADL disability, but a relatively high proportion (53%) reported memory problems. Their social network was relatively large (14.0) and almost all of them (88%) lived alone. Nearly one-third (29%) felt in control of the care, either with or without the help of other caregivers.

The second network type is characterised as ‘the small formal network’ (*N* = 16, 22%). This network contained 7.5 helpers on average, of whom 82% were formal helpers. There were only 1.4 informal caregivers in this network on average, providing an average of 20 hours of care per week; in about half the cases, the informal caregiver was a spouse or child sharing the recipient’s home. This informal caregiver was likely to be in touch with at least one of the formal helpers (65% in contact), and was likely to perform the same type of tasks as the formal helper (66% with task overlap), most often personal care and nursing care. The care recipients in this network type had the highest level of ADL and IADL disability and over one-third (38%) reported memory problems. On average, they had a rather small social network size (11.8) and over one-third (38%) felt they were in control of the care process. It is noteworthy that these care recipients were more likely to be male (44%) than in the other network types, although gender did not differ significantly between the four types.

The third network type was described as ‘the large mixed care network’ (*N* = 20, 27%), comprising the highest number of kin and non-kin informal caregivers. Of the 11.3 helpers in this network, 57% was formal caregivers. The 4.9 informal caregivers were mostly children living elsewhere and other non-kin informal caregivers. The formal and informal helpers provided comparable hours of care per week (7 and 9 hours respectively), but there was very little overlap in tasks between formal and informal caregivers (9%) and there was little contact (18%). In this network type, the formal helpers provided personal care and/or nursing care, whereas the informal caregivers provided only household care. This network type was found among care recipients who often felt in control of the care process (55%) and had the largest social network of all (16.8), although 85% lived alone. Their ADL and IADL disability levels were a little below average, and only 20% reported memory problems.

The fourth network is the ‘large formal care network’ (*N* = 21, 28%). This network was relatively large in size (13.6) with 80% being formal helpers. In

**Table 2** Mean network characteristics of the four network types ( $N = 74$ )

$N$ (%)	(1) Small, mixed network 17 (23%)	(2) Small formal network 16 (22%)	(3) Large mixed network 20 (27%)	(4) Large formal network 21 (28%)	Total 74 (100%)	$P$ ( $F$ )	Pairwise comparison*
<b>Structure</b>							
Total CG (2–22)	5.12	7.50	11.30	13.62	9.72	0.00	b,c,d,e
% FCG (0–1)	0.49	0.82	0.57	0.80	0.67	0.00	a,c,d,f
No. FCG (1–18)	2.53	6.13	6.35	11.00	6.70	0.00	a,b,c,e,f
No. ICG (1–9)	2.59	1.38	4.95	2.62	2.97	0.00	b,d,f
No. residential ICG (0–1)	0.12	0.44	0.15	0.29	0.24	0.12	
No. extra-residential child (0–7)	1.12	0.38	2.10	1.14	1.23	0.01	d
No. other kin (0–6)	0.53	0.25	0.90	0.43	0.54	0.18	
No. other non-kin (0–5)	0.82	0.31	1.80	0.76	0.96	0.00	d
<b>Function</b>							
% ICG – FCG contact (0–1)	0.15	0.65	0.18	0.49	0.34	0.00	a,c,d,f
% ICG – FCG task overlap (0–1)	0.42	0.66	0.09	0.22	0.29	0.00	a,b,d,e
Total hours of informal care (0–112)	4.39	20.05	9.03	16.35	12.43	0.10	
Total hours of formal care (0–31)	5.69	8.65	7.22	13.12	8.85	0.00	c,f

CG, caregiver; ICG, informal caregiver; FCG, formal caregiver.

\* $P < 0.05$  in pairwise comparison: a 1 vs. 2; b 1 vs. 3; c 1 vs. 4; d 2 vs. 3; e 2 vs. 4; f 3 vs. 4.**Table 3** Network types by characteristics of the care recipient ( $N = 74$ )

	(1) Small mixed network		(2) Small formal network		(3) Large mixed network		(4) Large formal network		Total			
<i>N</i>	17 (23%)		16 (22%)		20 (27%)		21 (28%)		74 (100%)			
	%	M (SD)	%	M (SD)	%	M (SD)	%	M (SD)	%	M (SD)	<i>P</i> ( <i>F</i> / $\chi^2$ )	Pairwise comparison*
Background												
% Female	65		56		75		76		69		0.55	
Age (66–99)		83.6 (6.8)		82.3 (7.4)		82.6 (8.6)		84.5 (7.9)		83.3 (7.7)	0.81	
Level of education (1–6)		3.5 (1.6)		3.4 (1.1)		4.2 (1.4)		3.5 (1.2)		3.7 (1.3)	0.29	
Health												
No. of chronic diseases (0–5)		1.9 (1.1)		2.4 (1.0)		1.9 (0.8)		1.7 (1.0)		2.0 (1.0)	0.17	
ADL (5–25)		9.8 (3.4)		14.8 (5.2)		9.4 (2.8)		13.3 (5.6)		11.8 (4.9)	0.00	a,d,f
IADL (11–49)		21.5 (4.9)		27.2 (8.1)		21.9 (5.8)		25.2 (8.2)		23.9 (7.1)	0.06	
% with memory problems	53		38		20		14		30		0.04	
Dispositional factors												
% in control of care	29		38		55		14		34		0.05	
Mastery (7–25)		14.6 (3.3)		18.6 (3.0)		15.2 (4.6)		17.0 (4.1)		16.3 (4.1)	0.02	a
Prefers informal care (11–23 = high)		19.3 (4.9)		19.9 (5.5)		7.5 (4.4)		19.5 (3.2)		19.1 (4.5)	0.30	
Social context												
% living alone	88		56		85		71		76		0.12	
Social network (2–28)		14.0 (6.0)		11.8 (5.4)		16.8 (6.0)		10.1 (5.3)		13.2 (6.2)	0.00	f

ADL, activities of daily living; IADL, instrumental activities of daily living.

\* $P < 0.05$  in pairwise comparison: a 1 vs. 2; b 1 vs. 3; c 1 vs. 4; d 2 vs. 3; e 2 vs. 4; f 3 vs. 4.

terms of numbers, there were 11 different formal helpers providing 13.1 hours of care per week and 2.6 informal helpers providing a total of 16.4 hours of

care per week. The latter were a mix of carers living in the recipient's home, children living elsewhere and other non-kin. Both formal and informal helpers



provided household care, but formal helpers mostly came in to provide personal care. The majority of the care recipients (60%) received nursing care, and this was generally provided by formal carers only. As a result, task overlap within the formal–informal dyads was low (22%), but contact was frequent (49%). The care recipients in this network type reported the highest levels of ADL and IADL disability, and only a small proportion reported memory problems (14%). Yet, they had the smallest social network size (10.1) and the least perceived control of the care process (14%).

## Discussion

By identifying all different informal and formal caregivers in the network of a purposive sample of older adults living at home, we constructed four different network types (RQ 1) that were associated with health status, feeling in control of the care process, sense of mastery and social network size (RQ 2). Our findings contribute to a greater understanding of how the linkage between formal and informal caregivers can be strengthened in different types of networks.

Contact between formal and informal caregivers is highest in the ‘small formal network’, which closely resembles the sole spousal caregiver network found by Keating and Dosman (2009). The presence of a spouse or other caregiver living in the recipient’s home seems to be crucial for the enhancement of formal–informal contact, primarily because this type of caregiver lives in the same household, provides many hours of care and shares many of the tasks with the formal caregivers. This all contributes to the opportunity to discuss care with formal caregivers. In the case of a sole spousal caregiver, formal caregivers may be quite used to discussing the care and may be alert to the risk of spousal caregivers becoming overburdened (Ward-Griffin & McKeever 2000). It is also known that spousal caregivers are quite reluctant to involve other informal caregivers and refrain from asking others for help (Broese van Groenou *et al.* 2013). Within this type of network, formal caregivers may thus focus on discussing the options to expand the informal care network, and on helping spousal caregivers to mobilise more helpers from the care recipient’s social network.

By contrast, in network types that include kin living outside the recipient’s home and non-kin relationships (small and large mixed network types), task overlap was limited and contact was relatively low. These findings suggest that contact on care issues in networks with only non-residential informal caregiv-

ers requires explicit organisation and timing of shared moments by formal organisations. This is especially necessary where the care recipient lacks the capacity to control the care process, as seems to be the case in the ‘small mixed network’ type. When the informal network is quite large, as in the ‘large mixed network’, it may be helpful to identify specific dyads between formal and informal caregivers who co-ordinate the care within their own sub-networks of caregivers.

The ‘large formal network’ type is characterised by a relatively high share of formal caregivers (80% on average) and a median level of contact between formal and informal caregivers. The high ADL and IADL disability of the care recipient is associated with many different formal caregivers being present. This reflects current formal care practices in the Netherlands in which household chores, personal care and nursing care are often provided by separate teams of multiple caregivers. Contact is thus likely to take place only in specific dyads, such as between the formal team representative(s) and one or two of the informal caregivers. Contact and communication in this type of care network could be enhanced by reducing task differentiation among the formal teams. Fewer formal caregivers performing multiple tasks limit the number of different faces in the household and may enhance formal–informal connection.

Some comments can be made regarding the limitations of our study. First, the study was restricted to older adults using mixed forms of care, who represent a minority of older care recipients. It should be borne in mind that the frail health and social context of this selective group contributed strongly to these network types. Their poor health contributes to the presence of many formal carers, their spouse or social network to the presence of one or more informal carers. Network types and profiles may thus differ from those involving only informal or only formal care. A comparison of older adults using only informal, only formal and mixed forms of care would further increase the understanding of the importance of health, disposition and social context for care network types. Second, the small number of older adults restricted the choice of analyses to a large degree. Multivariate multinomial logistic regression analyses were not practicable as the number of cases was too small for the number of variables involved here (Bentler & Chou 1987). This limits conclusions regarding the relative impact of the need, disposition and enabling factors for care use, and argues for the study to be repeated in a larger sample. Third, the findings are based on a small, selective purposive sample living within a highly urbanised region in the

Netherlands, and cannot therefore be applied to the general population of older adults in the Netherlands. In addition, due to national differences in the availability of formal care, the care networks of older people may prove to be very different in other western societies, especially in the southern and eastern parts of Europe. If researchers in other countries were to repeat the method to identify care networks of older adults, cross-national comparisons could provide an indication of the relative importance of individual characteristics and national long-term care policies for the features of (mixed) care networks.

To conclude, our study mapped the presence of individual caregivers within the home environment to gain a better understanding of who is there, what they do and whether one type of caregiver meets the other. This provided a snapshot of a specific phase in the care process, in which formal caregivers have entered at a certain point in time. We recommend that home-care organisations identify the informal care network at an early stage of formal care provision, establish contact with a designated co-ordinating informal caregiver and discuss expectations regarding roles, tasks and timing of communication. By taking a network perspective and joining forces with informal caregivers, home-care organisations could influence both the structure and functioning of mixed care networks of frail older adults.

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